Attorney Docket No. 9251-2

WASTE CONTAINER WITH SECURITY FRAME

Field of the Invention

The present invention relates generally to waste containers, and more specifically to large waste containers that are emptied by a commercial waste company vehicle.

Background of the Invention

Many businesses utilize a large waste container, located outside the building itself, to collect waste generated during the business day. Sometimes referred to as "dumpsters", such containers may be as large as ten cubic yards in volume. Many containers have a general box-type structure and include multiple openings for access to the interior of the container. For example, a typical container is open on the top and has sliding doors on one side, either of which provide access for the disposal of waste.

In many instances, such containers are emptied by large collection vehicles that lift the container and invert it above the bed of the vehicle, which allows waste within the container to drop into the vehicle bed through the open top end of the container. Typically the container will include holes, rails, channels or other engagement structures that engage the prongs of a forklift-type elevating device attached to the truck to enable the device to lift and manipulate the container.

These types of containers, particularly when used by businesses, can have some security issues. First, other businesses and persons may deposit their unwanted trash or hazardous materials in the container. This can raise the cost of trash collection for the business owner or the collector, as many trash collection concerns charge their customers based on the weight of the container. Second, many businesses suffer from employee theft, wherein the employee will hide a stolen item in the dumpster during his shift and return after

his shift to collect the item. Third, some materials (such as food) are scavenged from the containers.

Some attempts have been made to prevent unwanted use of the containers. One approach employs a lid on the container and a mechanical locking system that keeps the lid in place when the container is upright. Any doors on the front wall of the container are locked except when trash is being deposited. When the container is inverted for emptying, the lid moves to an open position. However, the container and lid tend to be cumbersome (often the lid cannot be opened without a collection vehicle, or the lid may stick in the closed position during emptying) and there have been durability concerns.

Another difficulty is that many trash collectors and landfills assess fees for collection based on the weight of the trash within the container. When the container is exposed to rain, the waste within the trash can become much heavier, so the customer is charged extra. Lids that are typically used with containers of this type are generally not watertight, so the customer may pay extra for collection of the same refuse.

Summary of the Invention

The present invention can provide solutions to the aforementioned problems with unwanted container usage. As a first aspect, embodiments of the present invention are directed to a secured trash container system. The system comprises a container with side walls and an open top end, the side walls including engagement locations, and a protective frame. The frame includes: a base; a plurality of uprights mounted with the base and extending upwardly therefrom, two of the uprights being separated from each other to define an open front side; and a roof supported by the uprights. The base, uprights and roof define a storage cavity wherein the container resides. The roof covers the open top end of the container. The container is configured to pass through the open front side of the frame. In this configuration, the presence of the roof over the open top end of the container can prevent unwanted access to the container, but can permit the container to be emptied in a conventional manner by passing the container through the open front side of the frame.

As a second aspect, embodiments of the present invention are directed to a method of emptying trash from a trash containment system. The method comprises as a first step: (a) providing a trash containment system, the system including a container with side walls and an open top end, the side walls including engagement locations, and a protective frame, the

frame including: a base; a plurality of uprights mounted with the base and extending upwardly therefrom, two of the uprights being separated from each other to define an open front side; and a roof supported by the uprights, the base, uprights and roof defining a storage cavity; wherein the container resides in the storage cavity and the roof covers the open top end of the container. The method further comprises the steps of: (b) engaging the container with a trash collection vehicle; (c) translating the engaged container forwardly through the open front side of the frame with the vehicle; and (d) lifting and inverting the container over the vehicle to empty trash contained in the container into the vehicle.

Brief Description of the Drawings

Figure 1 is a perspective view of an embodiment of the frame of a container security system of the present invention.

Figure 2 is a front view of the frame of **Figure 1** with an embodiment of a container that can be employed with a container security system of the present invention.

Figure 3 is a front view of the frame and container of **Figure 2** indicating how the doors of the container can be opened for the depositing of trash in the container.

Figure 4 is a side view of the system of **Figure 2** with the prongs of a collection vehicle entering the channels of the container just prior to emptying.

Figure 5 is a side view of the system of **Figure 4** with the prongs of the vehicle engaged in the container channels and the container sliding forward away from the frame.

Figure 6 is a side view of a collection vehicle emptying the container of **Figure 4**.

Figure 7 is a perspective view of another embodiment of the frame of a container security system of the present invention.

Figure 8 is a perspective view of still another embodiment of the frame of a container security system of the present invention.

Detailed Description of Embodiments of the Invention

The present invention will now be described more fully hereinafter, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. In

the drawings, like numbers refer to like elements throughout. Thicknesses and dimensions of some components may be exaggerated for clarity. It will be understood that when an element is referred to as being "attached", "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. In contrast, when an element is referred to as being "directly connected" or "directly coupled" to another element, there are no intervening elements present.

Turning now to the figures, a secure container system, designated broadly at **10**, is illustrated in **Figures 1-6**. The system **10** includes a frame **12** and a container **30**, each of which is described separately below.

Referring now to **Figure 1**, the frame **12** is a skeletal structure. It includes a pair of crossbeams **14** that rest on the underlying surface, a pair of lower guide rails **16** that are attached to opposite ends of the crossbeams **14** (the crossbeams **14** and the guide rails **16** together forming a base **15**), two vertically-disposed front uprights **18** that rise from intermediate portions of the lower side rails **16**, two vertically-disposed rear uprights **20** that rise from rear end portions of the lower side rails **16**, and a roof **24**. Flanges **23** extend laterally from the front and rear uprights **18, 20** to provide locations to bolt or otherwise attach the frame **12** to the underlying surface.

As used herein, the terms "forward", "front" and derivatives thereof refer to the direction defined by a vector extending from each rear upright **20** of the frame **12** toward its corresponding front upright **18** parallel to the underlying surface. Conversely, the terms "rearward" and derivatives thereof refer to the direction directly opposite the forward direction; i.e., the rearward direction is defined by a vector that extends from each front upright **18** toward its corresponding rear upright **20** parallel to the underlying surface. The forward and rearward directions together comprise the "longitudinal" direction relative to the system **10**. The term "outward", "lateral" and derivatives thereof refer to the direction defined by a vector originating in the center of the frame **12** and extending in the plane of the underlying surface and perpendicular to the forward and rearward directions. The terms "inboard", "inward" and derivatives thereof refer to the direction directly opposite to the lateral direction as defined hereinabove. The outward and inward directions together comprise the "transverse" directions relative to the system **10**.

A roof **24** is mounted on the front and rear uprights **18, 20** via downdwardly-extending lower edges **21**. The roof **24** spans the distance between these mounting locations

both longitudinally and transversely to provide a cover for the frame **12**. In the illustrated embodiment, the central portion **26** of the roof **24** slopes downwardly from front to rear to encourage drainage of rain water. Preferably, the roof **24** formed to prevent the entry of water to the structures below it.

The components comprising the frame **12** define an internal storage cavity **25**. The storage cavity **25** is typically between about five and twelve cubic yards in volume in order to house the container **30**, but may be of other sizes.

Those skilled in this art will recognize that the aforementioned members of the frame **12** can take a variety of configurations. They are typically formed of steel, but may also be formed of other metallic materials. The lower guide rails **16** are illustratively and preferably formed of angled members that can provide guides for the container **30** as it is moved into and out of the frame **12**. The lower guide rails **16** are mounted inwardly slightly from the front and rear uprights **18, 20** via gussets **17a** to conform to the shape of the typical container **30**. Similarly, the lower edges **21** of the roof **24** preferably include guides **22** to assist the container **30** as it moves within the frame **12**. The lower guide rails **16** also include stops **17** at their rearward ends.

Referring now to **Figure 2**, the container **30** includes a floor **32** supported by feet **33**, a front wall **34** with sliding doors **36**, opposing side walls **38**, and a rear wall **40**(shown in **Figure 4**). These form a box-like structure with an open upper end **42** (see **Figure 6**). In the illustrated embodiment, the side walls **38** are recessed at their bottom ends. The sliding doors **36** allow access to the cavity of the container **30**. Of course, the sliding doors **36** may be located at other locations on the container **30** (for example, on either of the side walls **38**) to permit access to the cavity of the container **30**. Typically, the front and side walls **34, 38** are sufficiently tall that their upper edges are positioned between about 1 and 3 inches (preferably between about 2 and 2.5 inches) from the roof **24** of the frame **12**, thereby preventing the insertion of most waste into the container through a gap between the walls **34, 38** and the roof **24**. Typically, the container cavity has a volume of between about four and ten cubic yards.

A longitudinally-extending channel **44** is attached to each side wall **38**. Each channel **44** is sized and positioned to receive a prong or other engagement component from a trash collection vehicle (described below). In the illustrated embodiment, the channels **44** extend over much of the longitudinal distance between the front wall **34** and the rear wall **40** and are continuous, although they need not be. Alternatives to the channel **44** may include holes,

flanges, ribs, rails, or the like that can mate with and engage a grasping structure from the vehicle. The channels **44** are located above the side rails **16** of the frame **12** when the container **30** is positioned within the cavity **25** of the frame **12**; the inward offset of the side rails **16** enables the channels **44** to fit within the frame **12**.

Use of the system **10** and the security that it can provide can be understood by reference to **Figures 2-6**. During typical usage, the container **30** is positioned within the storage cavity **25** of the frame **12**. The sliding doors **36** of the container **30** are closed and locked (see **Figure 2**). With the doors **36** locked, access to the container **30** is blocked, as the roof **24** covers the open end **42** of the container **30**; only by unlocking the doors **36** (see **Figure 3**) can trash be deposited in the container **30** through an open window **37**. As such, undesired use of the container **30** by, for example, employees hiding stolen goods or third parties improperly dumping their own trash, can be prevented.

When the container **30** is to be emptied, a vehicle **50** with prongs **52** approaches the front of the container **30**, which, as is the case during normal usage, has its doors **36** locked. The prongs **52** are inserted into the channels **44** on the container **30** (**Figure 4**). The vehicle **50** then slides the container **30** forwardly (**Figure 5**) until the rear wall **40** of the container **30** it clears the roof **24**; this motion is assisted by the presence of the side rails **16** of the frame **12**, as they maintain the container **30** at a height above the ground sufficient to avoid irregularities in the ground. After the rear wall **40** of the container **30** has cleared the front edge of the roof **24**, the vehicle **50** then lifts the container **30** over a collection bed on the vehicle **50** and inverts it to dump the trash contained in the container **30** out of the open upper end **42** (**Figure 6**). After emptying the container **30**, the vehicle **50** then returns the container **30** to its position within the storage cavity **25** of the frame **12** guided by the lower guide rails **16** and the guides **22**. This movement ceases when the rear wall **40** of the container **30** contacts the stops **17**. Thus, emptying of the container **30** can be accomplished quickly and easily, in much the same manner as conventionally performed, despite the presence of the frame **12**.

Another embodiment of a frame, designated broadly at **60**, is illustrated in **Figure 7**. The frame **60** includes crossbeams **62**, side rails **64**, front uprights **66**, and rear uprights **68** that correspond to the same structures illustrated and described in connection with **Figures 1-6**. However, the frame **60** includes a much taller roof **70** that has side walls **72**, a rear wall (not shown), and a sloping front wall **74**. The front wall **74** includes sliding doors **76** through

which trash can be deposited into a container. The frame **60** may be particularly useful when the container is positioned below a dock or platform from which the trash would ordinarily be dumped into the open end of the container **30'**. The doors **76** remain locked until trash is deposited, at which point they are unlocked for the deposition of trash, then re-locked afterward. The frame **60** can, thus, provide a secured trash container system for containers positioned below docks or platforms.

An additional embodiment of a frame, designated broadly at **80**, is illustrated in **Figure 8**. The frame **80** is similar to the frame **60** illustrated and described in connection with **Figure 7**, but includes a chute **82** for the deposition of trash into the container **30'** rather than sliding doors. This arrangement can also be used when the trash is typically deposited from a raised dock or platform.

Any of the embodiments illustrated and/or described herein may also provide a convenient mounting location for accessories for the container system **10**. For example, some containers include deodorizing units that help to curb any undesired odors emanating from the container. Also, some systems may include a fire suppression unit that can help to prevent unwanted fires. Other auxiliary units may also be mounted to the frame, and in particular to the roof, as may be desired.

The foregoing is illustrative of the present invention, and is not to be construed as limiting thereof. Although exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. As such, all such modifications are intended to be included within the scope of this invention. The scope of the invention is to be defined by the following claims.